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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,163

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Toshihiko Hirooka

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EXAMINER

NGO, TANYA T

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/562,163	<b>Applicant(s)</b> HIROOKA ET AL.	
	<b>Examiner</b> TANYA NGO	<b>Art Unit</b> 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 9 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9 is/are rejected.
- 7) ☒ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/23/2005, 9/26/2006, 5/27/2009</u> .                        | 6) <input type="checkbox"/> Other: ____.                          |



**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1 -6 and 9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Re Claim 1, the applicant claims a method that includes a step of maintaining the frequency spectral profile even if the transmitted optical pulse receives any linear time distortion in the optical fiber transmission line. The applicant states that it is a step in the method of implementing distortion free transmission; the applicant does not disclose how the spectral profile as to allow one of ordinary skill in the art to make or use the invention.

Re Claim 2-6 and 9, they are rejected as being dependent upon Claim 1.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-6 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re Claim 1, the applicant claims a method that includes a step of maintaining the frequency spectral profile even if the transmitted optical pulse receives any linear time distortion in the optical fiber transmission line. The applicant states that it is a step in the method of implementing distortion free transmission; the applicant does not specify whether the maintenance of the optical pulses is an active process, in which the user or device implements a device or process to ensure the maintenance of the spectral profile, or whether the maintenance of the spectral profile is passive or inherently maintained, meaning the maintenance of the spectral profile is a result of the previous steps of the method. It seems from the specification it is the result of a process, rather than an active maintenance of the spectrum. The specification states "a spectral profile is maintained completely even when the time domain-waveform is distorted because of the linear effect of the optical fiber" on page 4, lines 5-8 of the specification. Since it is the linear effect of the optical fiber that results in the maintenance of the spectral profile, the examiner is treating the limitation concerning maintenance to be inherent to the optical fiber.

Re Claim 2-6 and 9, they are rejected as being dependent upon Claim 1.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 1, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azana et al (herein Azana) "Real-Time Fourier Transformations performed simultaneously over Multiwavelength signals", IEEE Photonics Technology Letters, Vol. 13, No. 1, Jan 2001 in combination with Caponi et al (herein Caponi) US Patent 5, 852, 700.

Re Claim 1, Azana discloses converting the OTDM signal pulse train to a spectrum sequence of wavelength division multiplexed (WDM) signal by means of an optical Fourier transform circuit for converting an optical pulse waveform in the time domain to the frequency spectral profile of the pulse wherein the converted optical pulse train is incident on an optical fiber transmission line because sending an real time Fourier transformation of a pulse, such as those sent in optical time division multiplexing, because the incident signal upon the superimposed linearly chirped fiber grating does not essentially affect the energy spectrum of the signal (*The implementation of having multiple TDM signal pulse trains, paragraph I, lines 4-9, multiplexed into a WDM signal is preferable because it allows for on to access the huge bandwidth available in an optical fiber, paragraph II, lines 1-3. Azana continues state that the signals are real time Fourier transformed and sent in a linearly chirped filer, paragraph II, lines 6-10, the results of sending a Fourier Transformed pulsed through a linearly chirped fiber do not affect the energy distribution of the spectrum, Fig. 4e, paragraph 6, lines 31-35.*).

Azana does not disclose converting the WDM signal spectral sequence after transmission in the optical fiber transmission line-to an OTDM signal pulse train by means of an optical inverse Fourier transform circuit for receiving an optical pulse train incident on

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the optical fiber transmission line and transmitted in the optical fiber transmission line and converting the frequency spectral profile to the optical pulse waveform of the pulse in the time domain, to regenerate the time-domain waveform of the OTDM signal pulse train before transmission. However, at the time of the invention, it would have been obvious to one of ordinary skill in the art to inverse Fourier Transform the received signal because the signal that is sent is Fourier transform and in the frequency domain. Since the signal is in the frequency domain, it can not be processed or understood until it returns to the time domain, which is done through an inverse Fourier Transform.

Azana does not disclose using a transform-limited pulse having an exact spectral width with respect to the time-domain waveform as an optical time-division multiplexed (OTDM) signal pulse train. Caponi discloses that a transform limited pulse has a shape and band characteristics that allow it to propagate with as little distortion as possible, Col. 1 lines 39-44). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use a transform-limited pulse having an exact spectral width with respect to the time-domain waveform as an optical time-division multiplexed (OTDM) signal pulse train to attain the aforementioned invention, which is a pulse that propagates with as little distortion as possible.

Azana does not disclose as maintaining the frequency spectral profile even if the transmitted optical pulse receives any linear time distortion in the optical fiber transmission line. However, the examiner is interpreting that the maintenance of the spectral profile is

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maintained because the signals is being sent through a linearly chirped fiber grating, as disclosed by Azana, paragraph I, lines 12-16.

Re Claim 4, Azana and Caponi disclose all the elements of Claim 1, which Claim 4 is dependent upon. Azana and Caponi do not disclose the tolerance of the optical transmission signal with respect to either or both of dispersion and polarization-mode dispersion is increased by increasing the effective time width of the optical Fourier transform sufficiently in comparison with the time width of the input optical pulse train. However, at the time of the invention, it would have been obvious to one of ordinary skill in the art to by increasing the effective time width of the optical Fourier transform sufficiently in comparison with the time width of the input optical pulse train because the more effective time is between the pulses, farther the pulse are from each other. Therefore, the spreading of the pulse due to dispersion has more time around itself to spread before interfering with the pulses in front of or previous to the actual pulse and this reduction of interference is the reduction of dispersion.

Re Claim 5, Azana and Caponi disclose all the elements of Claim 1, which Claim 5 is dependent upon. Azana and Caponi do not disclose dispersion element and a phase modulator of the optical inverse Fourier transform circuit on a receiver side use the completely inverted signs of those used in the optical Fourier transform circuit on a transmitter side. However, at the time of the invention, it would have been obvious to one of ordinary skill in the art to inverse Fourier Transform the received signal because the signal that is sent is Fourier transform and in the frequency domain. Since the signal is in the frequency domain, it can



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not be processed or understood until it returns to the time domain, which is done through an inverse Fourier Transform. Furthermore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to include a phase modulator in the inverse Fourier Transform circuit because the spectral components undergo a temporal realignment process according to the group delay characteristics of the superimposed linearly chirped fiber grating, paragraph 6, lines 33-35.

***Allowable Subject Matter***

7. Claims 2, 3, 6, and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANYA NGO whose telephone number is (571) 270-7488. The examiner can normally be reached on M - F from 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngo/

June 19, 2009

/Kenneth N Vanderpuye/

Supervisory Patent Examiner, Art Unit 2613